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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,757	08/14/2002	Douglas P. Boyd	125691	9669
23446	7590	07/28/2004	EXAMINER	
MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661			QADERI, RUNA S	
			ART UNIT	PAPER NUMBER
			3737	

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/064,757	Applicant(s) BOYD ET AL.	
	Examiner Runa S. Qaderi	Art Unit 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Boyd et al. (US 4,352,021).

Boyd et al. (hereinafter Boyd) discloses a system of obtaining cine images in a CT scanner, see figures 1 and 2 of Boyd below. With respect to claim 12 the system comprises a scan tube (11) that projects an electron beam (23) to target rings (26). The electron beam (23) sweeps across the target rings (26) to produce x-rays for irradiating the patients. A detector array (14) in the form of a ring overlaps the ring collimator. A couch between the target ring and detector ring is supported by a movable gurney (62) in order to vary the angle of the body axis with respect to the scanner axis. Regarding claim 16 the movable patient support is capable of being moved between said at least two CT scans or between sweeps. Feature 16 of figure 1 includes a beam control system, a data acquisition system, and an image reconstruction module (as claimed in 17), column 9 lines 26-41. Regarding claim 18 a scan is triggered by the EKG signal. A video display (19) satisfies the limitation to claim 13. Finally the system

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includes multiple target and detector rings as discussed in column 2 lines 41-57 of Boyd.

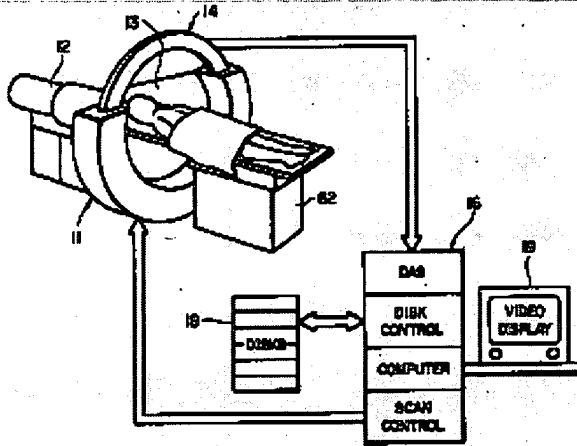


FIG. 1

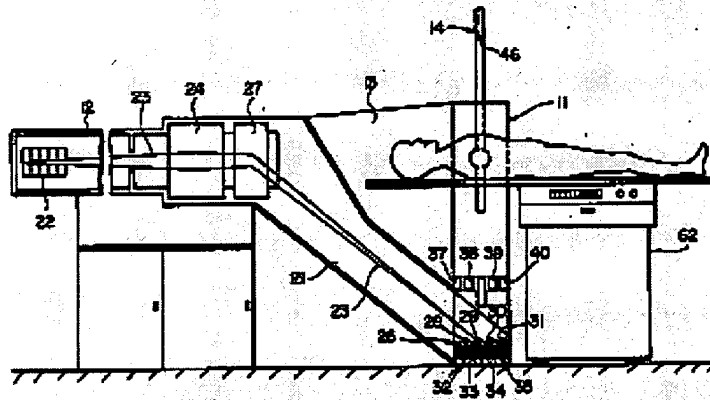


FIG. 2

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 6, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slack et al. (US 6,393,091)

Slack et al. (hereinafter Slack) discloses a method of obtaining cine or motion images of the heart with a CT scanner. Regarding the rejected claims the method includes the steps of positioning a patient (22) on a motorized table (46), scanning the patient with a first sweep of an x-ray fan beam triggered by a first point in the EKG signal of the patient, stepping or moving the patient to a new location, scanning the patient with a second sweep of x-ray fan beam triggered by a second point in the EKG signal of the patient, and forming and displaying motion image display based on the at least first and second sweep, column 4 lines 19-67.

The reference discloses step of assigning a scanning priority to phases of a representative cardiac cycle of the patient's heart, selecting phases of the cardiac cycle for scanning in accordance with the assigned scanning priority, and obtaining image slices of the patient's heart corresponding the selected phases of the cardiac cycle. The above steps of imaging based on selected phases encompass said first triggered event and said second trigger event to occur at predetermined time periods (as claimed in 5 and 6) whether that time frame be from a reference time frame or from the previous trigger event. Furthermore the step of forming a series of images over successive heartbeats is satisfied, see figure 3 and column 4.

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According to the applicant's definition of "prospective" gating, specification page 2, the triggering scheme of Slack is prospective in that the scan is triggered by EKG signal thereby satisfying the limitation of claim 8.

Regarding the rejected claims Slack does not disclose obtaining cine angiography images via the method as discussed above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have obtained cine angiography images rather than cine cardiac images because the same steps are involved in obtaining either image. Furthermore it is well within the known or an ordinary skilled artisan that both cine angiographic and cine cardiac images are to diagnose cardiac function. Both cine images serve the same purpose.

Claims 4, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slack et al. (US 6,393,091) in view of Mao et al. (US 6,708,052).

Slack discloses a method of as discussed above except for the step of triggering based on predetermined percentages of the cardiac cycle. Mao et al. (hereafter Mao) discloses prospective triggering an image acquisition scan starting with specific phase of the cardiac cycle, typically at 40-50% of R-R interval and at 70-80% of the R-R interval, column 1 lines 62-67. The combination of the teachings Slack and Mao would have been obvious to one of ordinary skill in the art at the time the invention was made because these percentages correspond to points of the cardiac cycle where cardiac motion is at

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a minimum as taught by Mao. Therefore during minimum cardiac motion image quality is improved because of a reduction in noise. Further taught by the Slack reference is that a scanning priority to the phases of the cardiac cycle is determined to minimize noise, column 3 lines 19-27.

Claims 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richey et al. (US 4,547,892) in view of Boyd et al. (US 4,736,396).

Richey discloses the production an image of the radiation attenuation of the heart at desired phases of the cardiac cycle with CT scanner. The method includes the steps irradiating the patient with X-rays, detected the radiation attenuation by the patient, converting the detected radiation to data signals, and generating a movie or cine presentation of the patient's heart. More specifically to claims 22, 26, and 27 the emitted radiation is triggered by the cardiac cycle of successive heartbeats. The cardiac cycle is defined as beginning with the R-wave and continuing until the occurrence of the next R-wave, column 2 lines 52-54. Prior to scanning a triggering pulse is determined to be applied a specific points of the cardiac cycle. Therefore the triggering pulse is predetermined as claimed in 23. The triggering of the radiation is within the cardiac cycle or between the R-R wave as claimed in 25. With respect to claim 24 Richey columns 3-5 and figure 3 discuss the various points within the cardiac phase that the scan is triggered. The recitation to scanning at a point x1 with respect to point xo satisfies the limitation of claim 24.

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Regarding the rejected claimed Richey does not teach the step of sweeping an electron beam over a target to generate the radiation to irradiate a patient. Richey does not expressly recite the movement of the patient during the scan.

Boyd '396 discloses a method of imaging a patient using high speed CT scanning. The method includes the step of sweeping an electron beam over a target to generate radiation to irradiate a patient being moved, See Abstract. The movement of the patient is discloses as both moving the patient as the measurements are being obtained which is interpreted as movement during the scan (claim 19 and 29 of applicant) and incremental movements of the patient as irradiating and detecting is done at each incrementation (claim 27 and 28), column 3 lines 62-65. The combination of teachings of Richey and Boyd '396 would have been obvious to one of ordinary skill in the art at the time the invention was made because such an electronic scanning method is vastly superior in speed to the mechanical scanning methods as taught in Boyd '396, column 1 lines 55-57.

Furthermore Richey in view of Boyd '396 does not expressly recite the rate that the patient is being moved as claimed in 21. It would have been obvious to one or ordinary skill in the art at the time the invention was made to provide any appropriate rate of motion of the patient during the scan process so as long as the image acquisition is attainable. Applicant does not disclose any specific advantage or any necessary purpose of moving the patient at a rate of three millimeters per second. Therefore one of ordinary skill in the art would

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have been motivated to move the patient at any appropriate rate such that image acquisition is successful.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Runa S. Qaderi whose telephone number is (703) 605-4285. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela D. Sykes can be reached on (703) 308-5181. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSQ
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Angela D. Sykes

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